

***FlyBy Math™* Alignment**
Kansas Curricular Standards for Mathematics
Jan 31, 2004

Standard 1: Number and Computation

Number and Computation – The student uses numerical and computational concepts and procedures in a variety of situations.

Benchmark 3: Estimation – The student uses computational estimation with rational numbers and the irrational number pi in a variety of situations.

<p><i>Ninth and Tenth Grade Knowledge Base Indicators</i> The student...</p> <p>2. estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology (2.4.K1a)</p>	<p><i>FlyBy Math™</i> Activities</p> <p>--Predict outcomes and explain results of mathematical models and experiments.</p>
<p><i>Ninth and Tenth Grade Application Indicators</i> The student...</p> <p>1. adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference)(2.4.A1a)</p>	<p><i>FlyBy Math™</i> Activities</p> <p>--Predict outcomes and explain results of mathematical models and experiments.</p>
<p>2. estimates to check whether or not the result of a real-world problem using rational numbers, the irrational number pi, and/or simple algebraic expressions is reasonable and makes predictions based on the information (2.4.A1a)</p>	<p>--Predict outcomes and explain results of mathematical models and experiments.</p>

Standard 2: Algebra

Algebra – The student uses algebraic concepts and procedures in a variety of situations.

Benchmark 1: Patterns – The student recognizes, describes, extends, develops, and explains the general rule of a pattern in a variety of situations.

<p><i>Ninth and Tenth Grade Application Indicators</i> The student...</p> <p>2. solves real-world problems with arithmetic or geometric sequences by using the explicit equation of the sequence (2.4.K1c)</p>	<p><i>FlyBy Math™</i> Activities</p> <p>--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.</p> <p>--Use tables, graphs, and equations to solve aircraft conflict problems.</p>
<p><i>Benchmark 2: Variables, Equations, and Inequalities – The student uses variables, symbols, real numbers, and algebraic expressions to solve linear equations and inequalities in a variety of situations.</i></p>	

<p><i>Ninth and Tenth Grade Knowledge Base Indicators</i> The student...</p> <p>3. solves: (2.4.K1d) c. systems of linear equations with two unknowns using integer coefficients and constants</p>	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.</p>
<p><i>Ninth and Tenth Grade Application Indicators</i> The student...</p> <p>1. represents real-world problems using variables, symbols, expressions, equations, inequalities, and simple systems of linear equations (2.4.A1c-e): c. systems of linear equations with whole number coefficients and constants</p> <p>2. represents and/or solves real-world problems with (2.4.A1c): a. linear equations and inequalities both analytically and graphically c. systems of linear equations with two unknowns</p>	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.</p>
<p><i>Benchmark 3: Functions – The student recognizes, analyzes constant functions in a variety of situations.</i></p>	
<p><i>Ninth and Tenth Grade Knowledge Base Indicators</i> The student...</p> <p>6. recognizes how changes in the constant and/or slope within a linear function changes the appearance of a graph (2.4.K1f)</p>	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Interpret the slope of a line in the context of a distance-rate-time problem.</p>
<p><i>Ninth and Tenth Grade Application Indicators</i> The student...</p> <p>1. translates between the numerical, graphical and symbolic representations of functions (2.4.A1c-e)</p> <p>2. interprets the meaning of the x- and y-intercepts, slope, and/or points on and off the line on a graph in the context of a real-world situation (2.4.A1e)</p>	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Interpret the slope of a line in the context of a distance-rate-time problem.</p>
<p>3. analyzes (2.4.A1c-e): a. the effects of parameter changes (scale changes or restricted domains) on the appearance of a function's graph, b. how changes in the constants and/or slope within a linear function affects the appearance of a graph</p>	<p>--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.</p> <p>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.</p>

Benchmark 4: Models – The student generates and uses mathematical models to represent and justify mathematical relationships in a variety of situations.

<p>Ninth and Tenth Grade Knowledge Base Indicators The student...</p> <p>1. knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include:</p> <ul style="list-style-type: none"> a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships and mathematical relationships and to solve equations; e. function tables to model numerical and algebraic relationships; f. coordinate planes to model relationships between ordered pairs and linear equations and inequalities; l. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots and box-and-whisker plots, and histograms to organize and display data 	<p>FlyBy Math™ Activities</p> <p>--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.</p> <p>--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.</p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p>
<p>Ninth and Tenth Grade Application Indicators The student...</p> <p>1. recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include:</p> <ul style="list-style-type: none"> a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships and problem situations and to solve equations; d. function tables to model numerical and algebraic relationships; e. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions; i. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms and matrices to describe, interpret, and analyze data 	<p>FlyBy Math™ Activities</p> <p>--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.</p> <p>--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.</p>
<p>3. uses the mathematical modeling process to analyze and make inferences about real-world situations</p>	<p>--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.</p>

Standard 3: Geometry

Geometry – The student uses geometric concepts and procedures in a variety of situations.

Benchmark 2: Measurement and Estimation – The student estimates, measures, and uses measurement formulas in a variety of situations.

Ninth and Tenth Grade Knowledge Base Indicators

The student...

1. determines and uses real number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, area, surface area, and angle measurement using standard and nonstandard units of measure (2.4.K1a)
2. selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate rational number representations for length, weight, volume, temperature, time, perimeter, area, surface area, mass, midpoint, and angle measurements. (2.4.K1a)

7. knows, explains, and uses ratios and proportions to describe rates of change (2.4.K1d)

FlyBy Math™ Activities

--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

--Interpret the slope of a line in the context of a distance-rate-time problem.

Ninth and Tenth Grade Application Indicators

The student...

1. solves real-world problems by (2.4.A1a):
e. using rates of change

2. estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, perimeter, area, and surface area in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference) (2.4.A1a)

FlyBy Math™ Activities

--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

--Predict outcomes and explain results of mathematical models and experiments.

--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

Benchmark 4: Geometry From An Algebraic Perspective – The student uses an algebraic perspective to analyze the geometry of two- and three-dimensional figures in a variety of situations.

Ninth and Tenth Grade Knowledge Base Indicators

The student...

3. calculates the slope of a line from a list of ordered pairs on the line and explains how the graph of the line is related to its slope (2.4.K1f).

FlyBy Math™ Activities

--Represent distance, speed, and time relationships for constant speed cases using linear equations and a

	<p>Cartesian coordinate system.</p> <p>--Interpret the slope of a line in the context of a distance-rate-time problem.</p>
<p><i>Ninth and Tenth Grade Application Indicators</i> The student...</p> <p>1. represents, generates, and/or solves real-world problems that involve distance and two-dimensional geometric figures including parabolas in the form $ax^2 + c$ (2.4.A1e)</p>	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.</p> <p>--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.</p>
<p>2. translates between the written, numeric, algebraic, and geometric representations of a real-world problem (2.4.A1a-e).</p>	<p>--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.</p>
<p>4. analyzes how changes in the constants and/or coefficients within the equation of a line or parabola affect the appearance of a graph.</p>	<p>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.</p>

Standard 4: Data

Data – The student uses concepts and procedures of data analysis in a variety of situations.

Benchmark 2: Statistics – The student collects, organizes, displays, explains, and interprets numerical (rational) and non-numerical data sets in a variety of situations.

<p><i>Ninth and Tenth Grade Knowledge Base Indicators</i> The student...</p> <p>1. organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays (2.4.K1I):</p> <ul style="list-style-type: none"> b. bar, line, and circle graphs, d. charts and tables 	<p><i>FlyBy Math™ Activities</i></p> <p>--Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs.</p>
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